

Notice of Allowability

Application No.

10/528,675

Examiner

Malgorzata A. Walicka

Applicant(s)

HOSHINO ET AL.

Art Unit

1652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to ____.
2. ☒ The allowed claim(s) is/are 1-14.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 03/23/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other ____.

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The application is a national stage of the PCT/EP03/10498. Claims 1-14 are pending and under examination.

DETAILED ACTION

1. Priority

Acknowledgment is made of Applicant's claim for priority based on Japanese European patent application EPO 02021650.3 filed Sept. 27, 2002. A copy of priority document has been filed. The priority of the instant claims to the EPO document has been granted.

2. Examiner's amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Please amend claim 4 as follows.

4. An isolated nucleic acid molecule encoding a polypeptide having aldehyde dehydrogenase activity, wherein said nucleic acid molecule hybridizes under stringent standard conditions to the complementary strand of a nucleic acid molecule of claim 1, wherein the stringent conditions comprise hybridizing overnight at about 42°C in a hybridization solution comprising 50% formamide, 5 X SSC, 0.2% sodium dodecyl sulfate, 0.1% N-lauroylsarcosine, and 2% blocking reagent, followed by washing in a solution comprising 0.1 X SSC at about 60°C.

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Please amend claim 6 as follows.

6. The expression vector of claims 5, wherein said vector is selected [from a vector or a derivative thereof selected] from the group consisting of pQE, pUC, pBluescript II, pACYC177, pACYC184, pVK100 and RSF1010.

Please amend claim 7 as follows.

7. A recombinant microorganism or a plant cell which is transformed with the expression vector of claim 5.

Please amend claim 8 as follows.

8. A recombinant microorganism or a plant cell which comprises the nucleic acid molecule of claim 1 integrated into its chromosomal DNA.

Please amend claim 9 as follows.

9. The microorganism of claim 8, wherein said microorganism is selected from the group consisting of bacteria[,], and yeast[,], and plant cells].

Authorization for this examiner's amendment was given in a telephone interview with Applicants representative Charles Avigliano on July 6, 2006.

3. Allowance

Claims 1-14 are allowed. The following is the examiner's reason for allowance.

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Applicants disclose an aldehyde dehydrogenase of SEQ ID NO: 2, encoded by DNA molecule of SEQ ID NO: 1, from *Gluconobacter oxydans* DSM4025. The enzyme is useful in production of L-ascorbic acid, i.e., vitamin C, and 2-keto-lgluconic acid (2-KGA) from L-sorbose. The invention is novel and nonobvious.

Gluconobacter oxydans DSM4025, current name *Ketogluconicum vulgare* DSM4025, has been known as a source of several enzymes since 1987, however, the claimed enzyme and the encoding DNA were for the first time described by Applicants. *Ketogluconicum vulgare* DSM4025 possesses three isoforms of l-sorbose dehydrogenase, SNDH1, SNDH2 and SNDH3, of which the aldehyde dehydrogenase disclosed in the instant application is currently named SNDH1; see Miyazaki et al. (Pyrroloquinoline Quinone-Dependent Dehydrogenases from *Ketogluconicum vulgare* Catalyze the Direct Conversion of L-Sorbose to L-Ascorbic Acid, *Applied and Environmental Microbiology*, **2006**, 72, 1487-1495, attached to this action). This may explain why ~~that~~ the bacterium having disrupted DNA molecules encoding SEQ ID NO:2 is still producing 2-KGA efficiently; see claim 13.

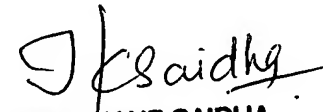
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Malgorzata A. Walicka whose telephone number is (571) 272-0944. The examiner can normally be reached on Monday-Friday from 10:00 a.m. to 4:30 p.m. If attempts to reach the examiner by

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telephone are unsuccessful, the examiner's supervisor, Ponnathapura Achutamurthy, can be reached on (571) 272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Malgorzata A. Walicka, Ph.D.
Art Unit 1652
Patent Examiner


TEKCHAND SAIDHA
PRIMARY EXAMINER